United States Patent [19]

Godbe et al.

[11] **Patent Number: 4,973,092**

[45] **Date of Patent: Nov. 27, 1990**

[54] **CLOSURE CLASP**

[76] Inventors: **Anthony L. R. Godbe,** 1794 Logan Ave., Salt Lake City, Utah 84108; **Hampton Godbe,** 1353½ Glenmare St., Salt Lake City, Utah 84105; **Betty G. Walker,** 1794 Logan Ave., Salt Lake City, Utah 84108

[21] Appl. No.: **306,878**

[22] Filed: **Feb. 3, 1989**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 112,491, Oct. 26, 1987, abandoned.

[51] **Int. Cl.**[5] **E05C 3/14**

[52] **U.S. Cl.** **292/190;** 292/241

[58] **Field of Search** ..... 24/643; 292/DIG. 10, 292/DIG. 11, DIG. 48, DIG. 50, 240, 241, 242, 190

[56] **References Cited**

U.S. PATENT DOCUMENTS

120,192	10/1871	Greenough	292/240
135,873	2/1873	Youngblood	292/240
217,146	7/1979	Quackenbush .	
312,195	2/1985	Ford .	
423,607	3/1890	Hunt .	
532,067	1/1895	Howe .	
617,582	1/1899	Kuhn .	
1,257,051	2/1918	Thomas et al. .	
2,267,704	12/1941	Abel	292/241
3,306,644	2/1967	Larsen	292/241
3,690,708	9/1972	Worley et al.	292/101
3,811,718	5/1974	Bates	292/241
4,807,914	2/1989	Fleming et al.	292/240

FOREIGN PATENT DOCUMENTS

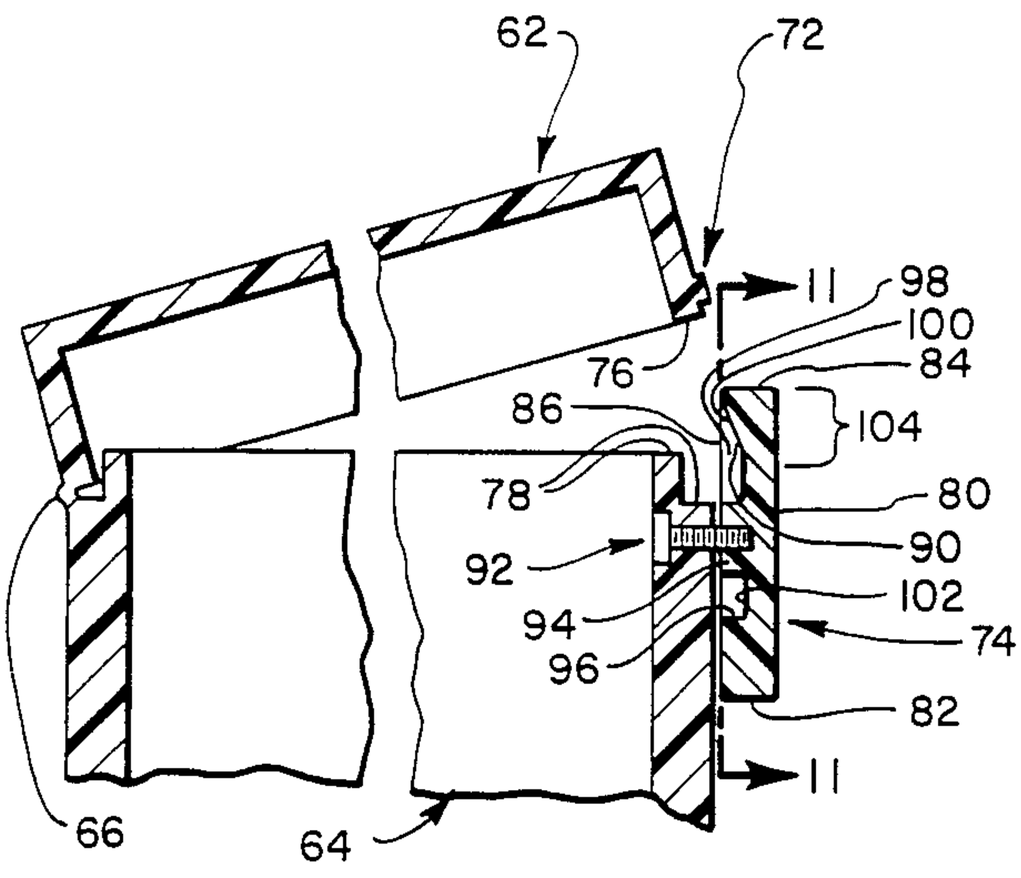
552300	11/1956	Belgium	292/241
159096	2/1940	Fed. Rep. of Germany	292/241
661959	8/1929	France	292/241
128153	5/1950	Sweden	292/241
10488	of 1892	United Kingdom .	

Primary Examiner—Eric K. Nicholson

[57] **ABSTRACT**

A rotatable knob mounted at one side of an opening to a container has formed on the underside thereof a recess and a channel extending therefrom through the periphery of the knob. Opposite the knob on the other side of the container opening is secured a clasp. When the knob is rotated into its open position with the catch channel directed toward the catch, closure of the opposite sides of the container opening moves the catch through the catch channel to the recess on the underside of the knob. Thereafter, rotation of the knob in either direction out of its open position, captures the catch in the recess on the underside of the knob. Release of the catch is accomplished by rotating the knob back to its open position. In an alternative embodiment, the catch channel terminates short of the periphery of the knob, but a portion of the knob extends beyond the edge of the container opening. In the opening position of the knob with the catch channel oriented toward the catch, the catch channel also extends beyond the edge of the container opening. The catch is received in this overhanging portion of the catch channel to enter the recess on the underside of the knob by pivoting with its respective portion of the container about a point remote from the catch and knob.

10 Claims, 3 Drawing Sheets



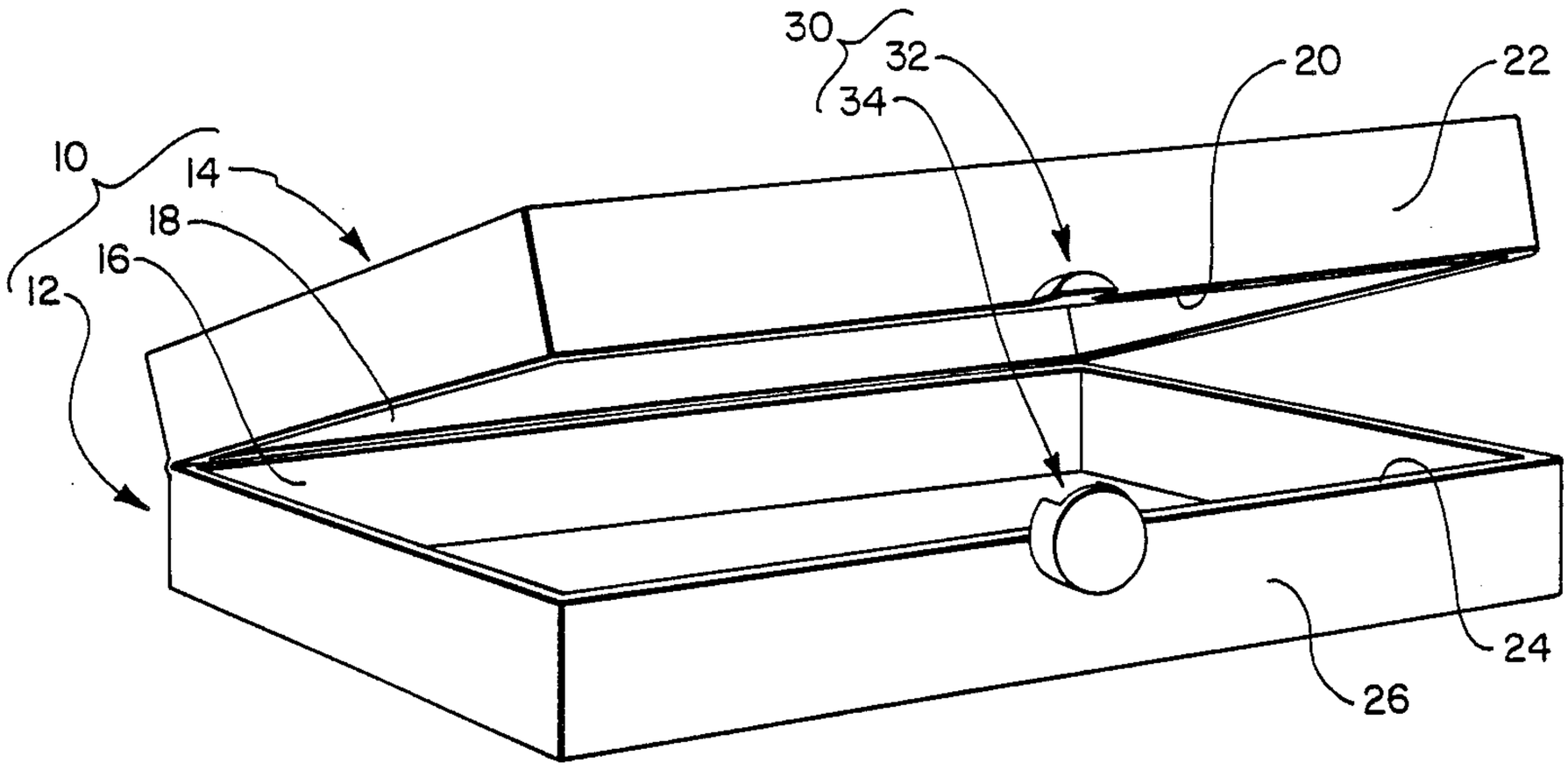


FIG. 1

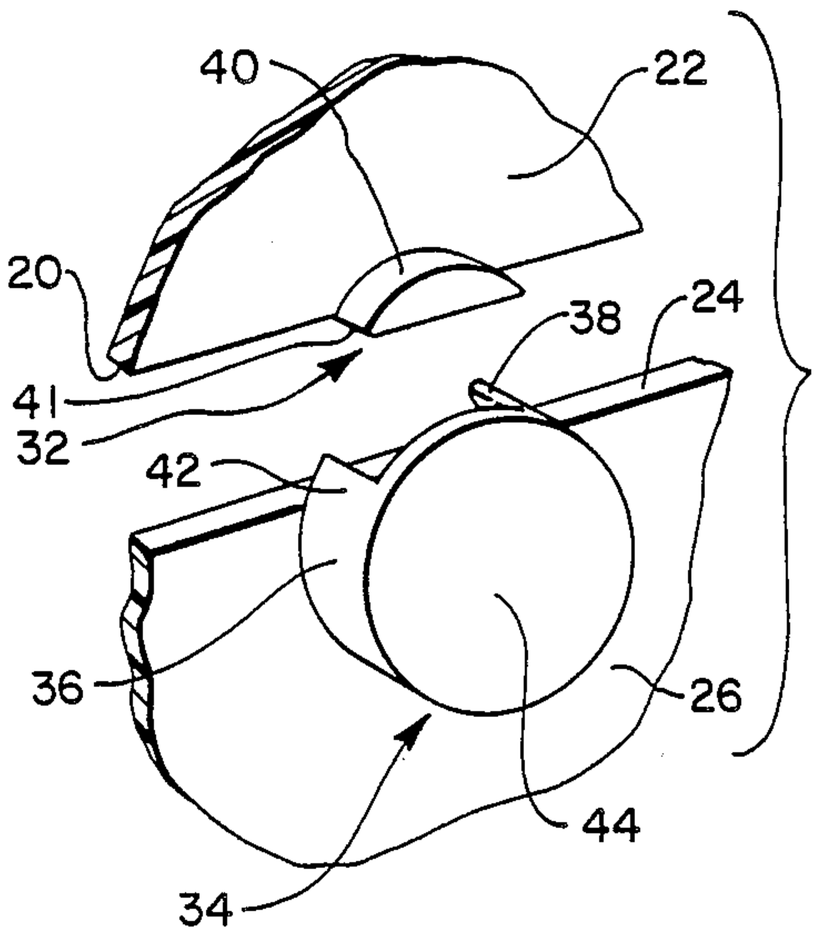


FIG. 2

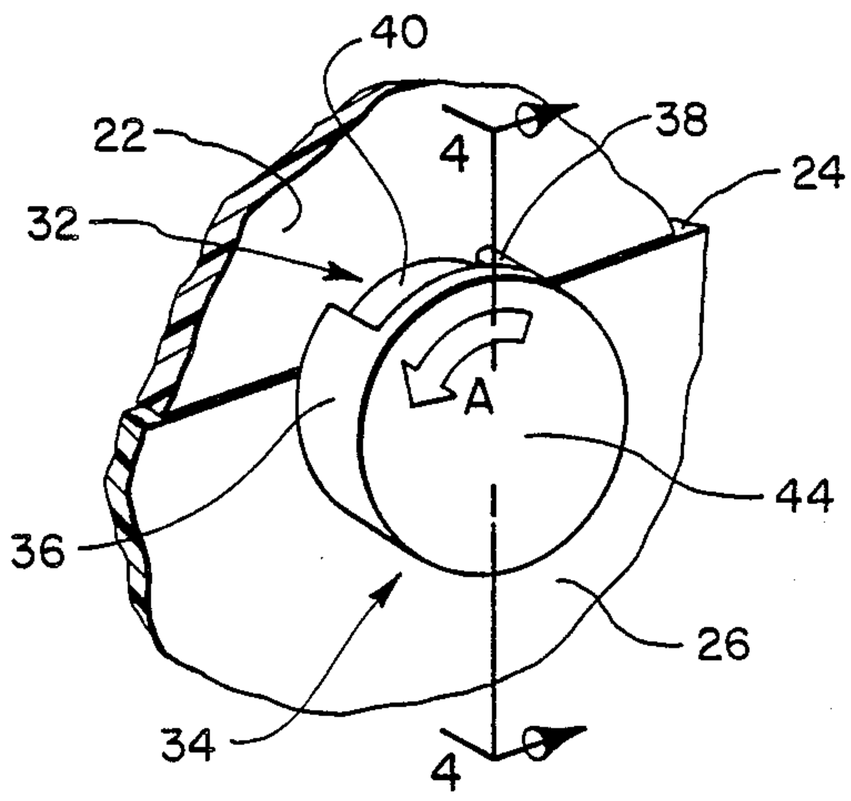


FIG. 3

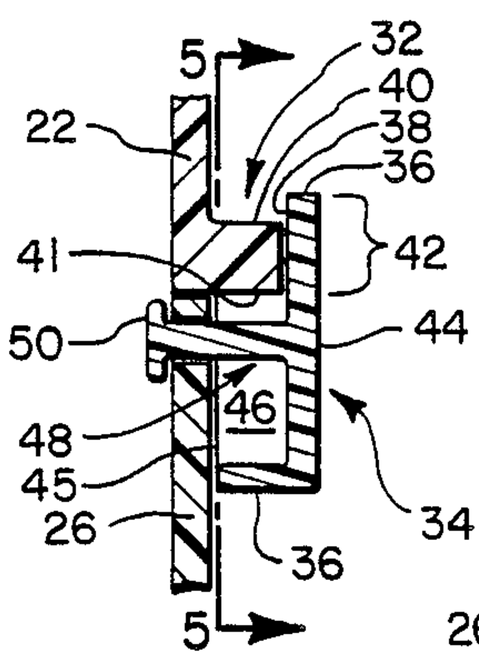


FIG. 4

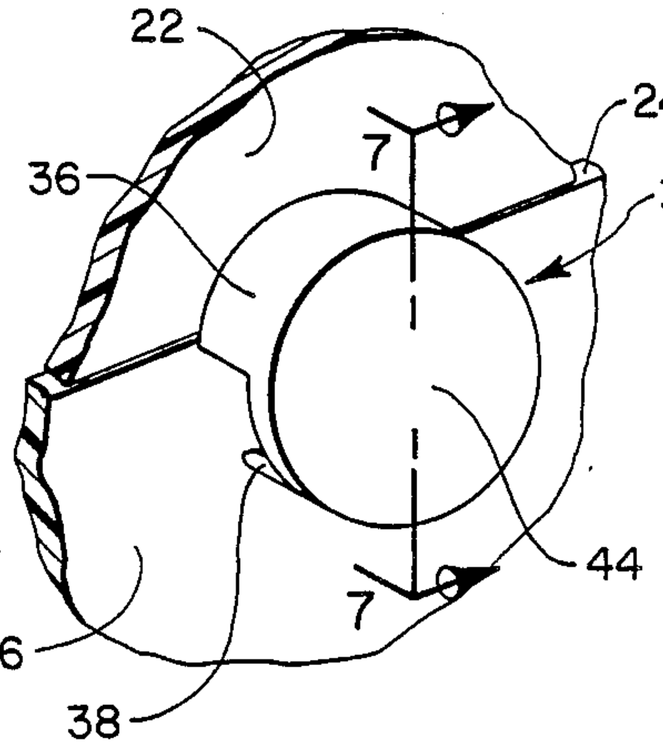


FIG. 6

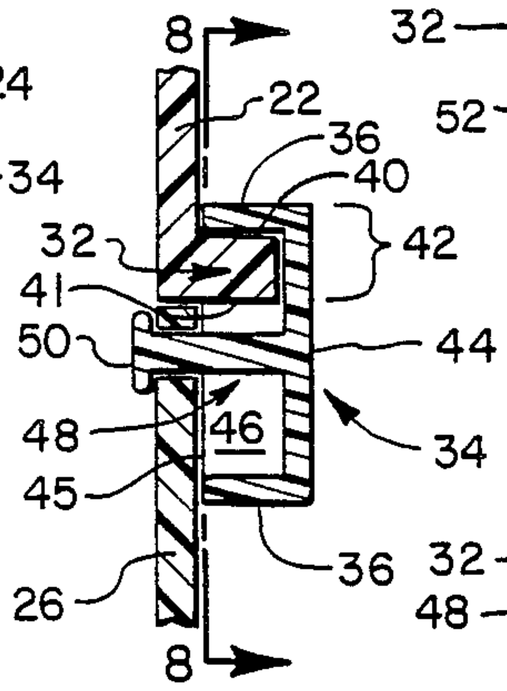


FIG. 7

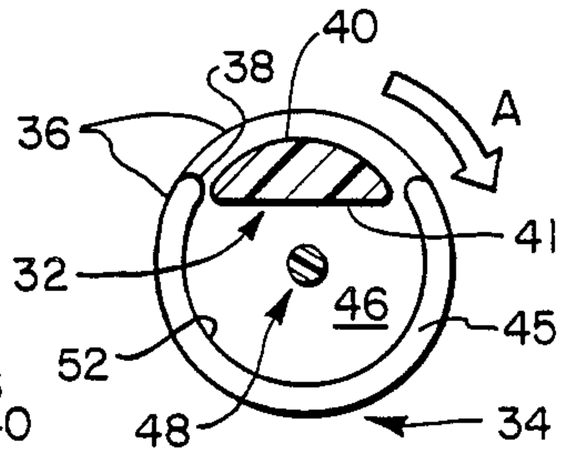


FIG. 5

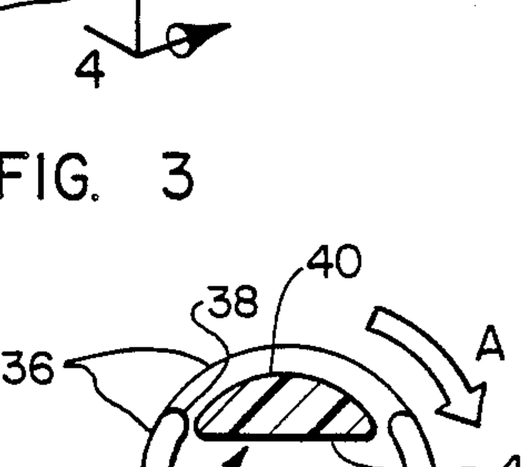


FIG. 8

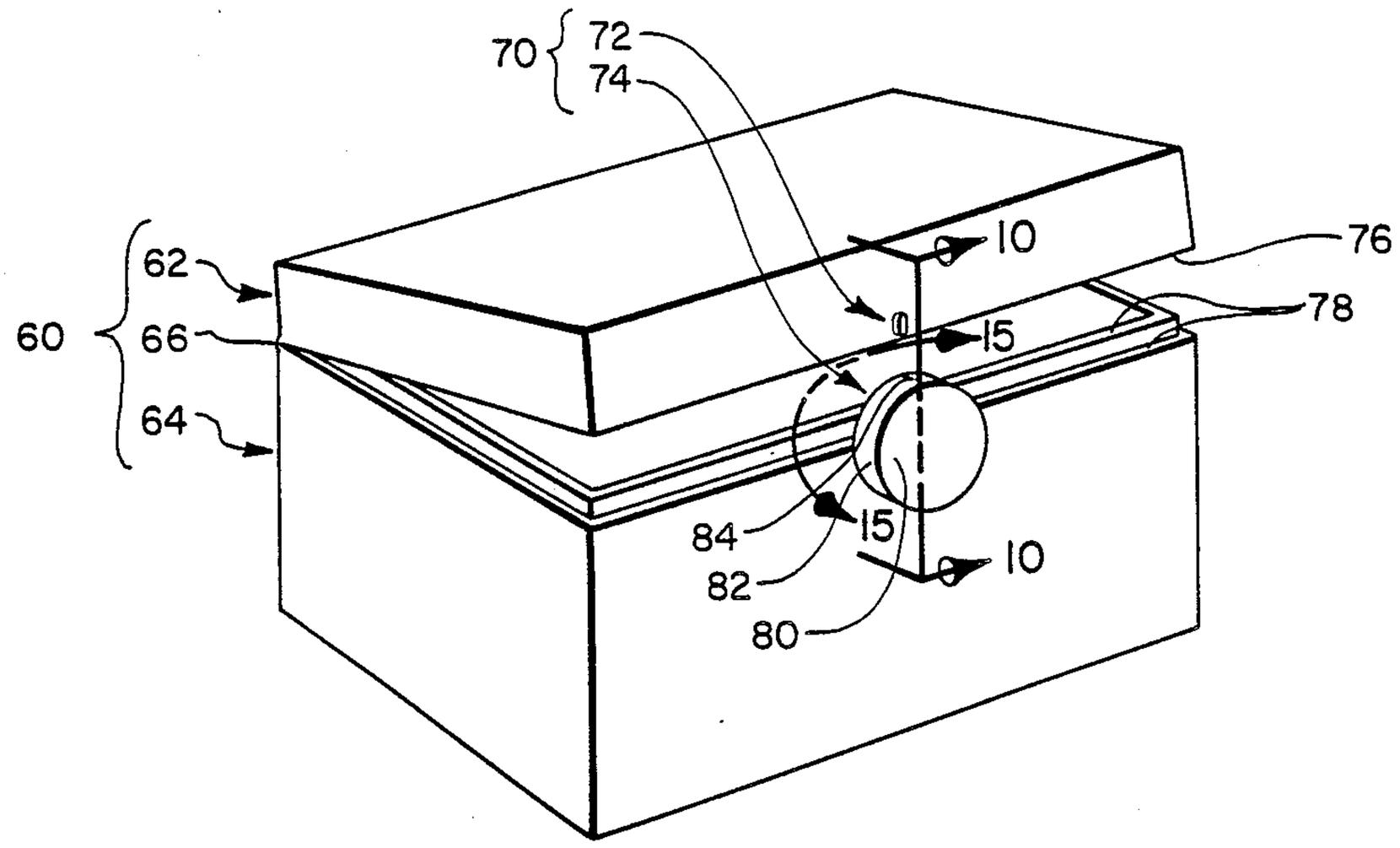


FIG. 9

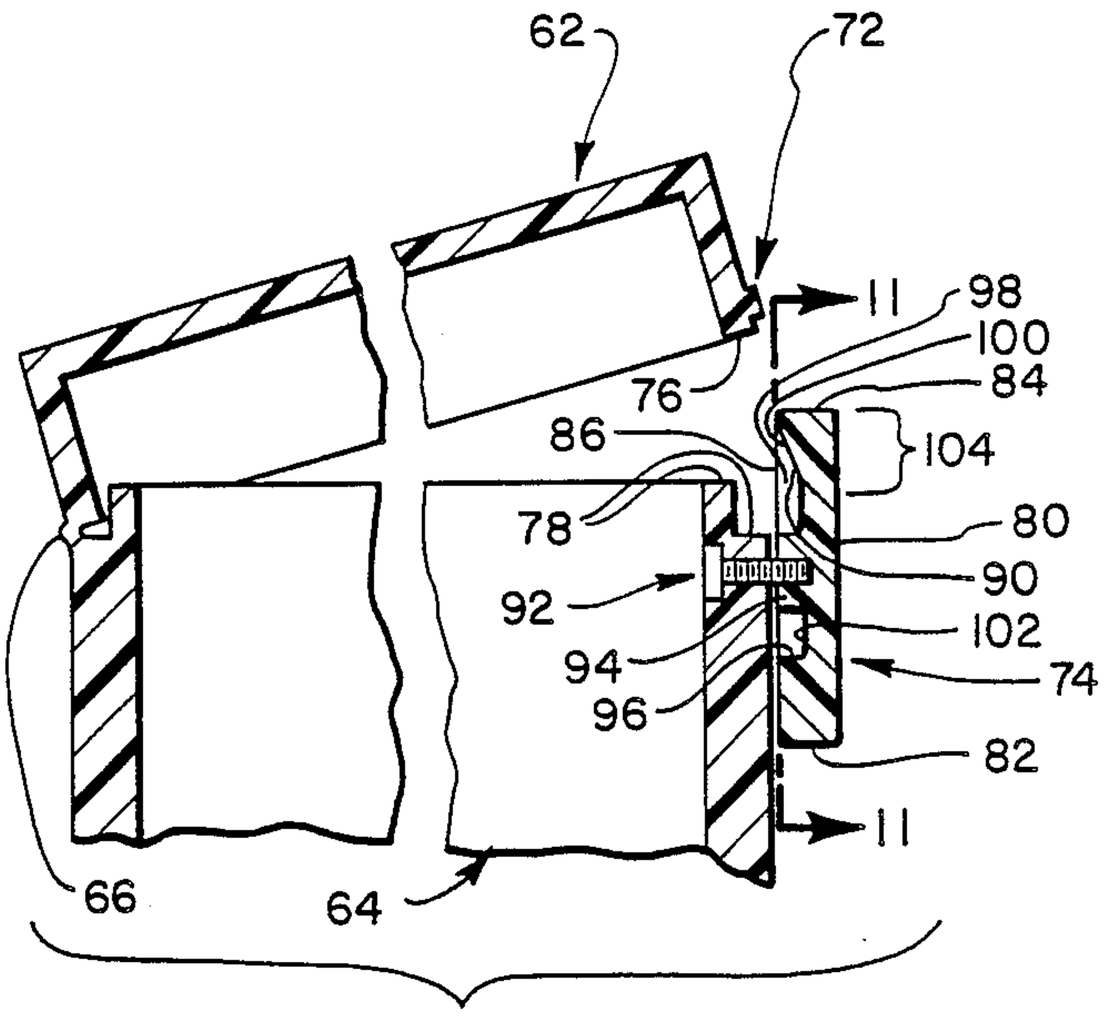


FIG. 10

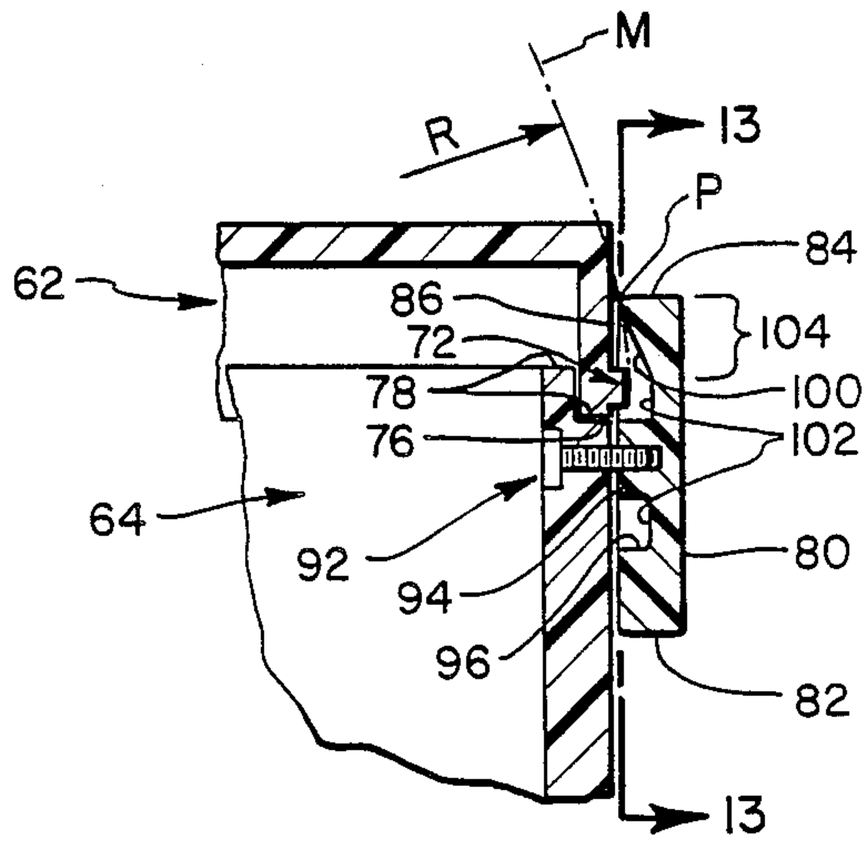


FIG. 12

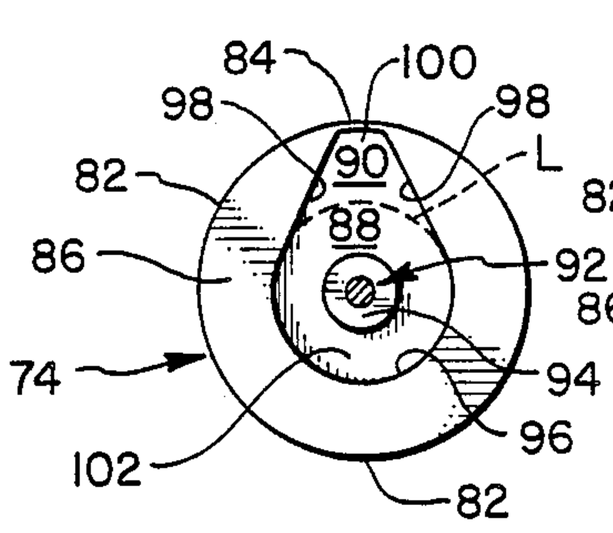


FIG. 11

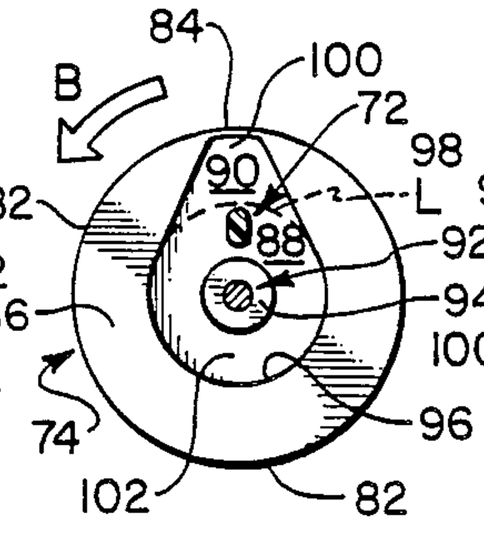


FIG. 13

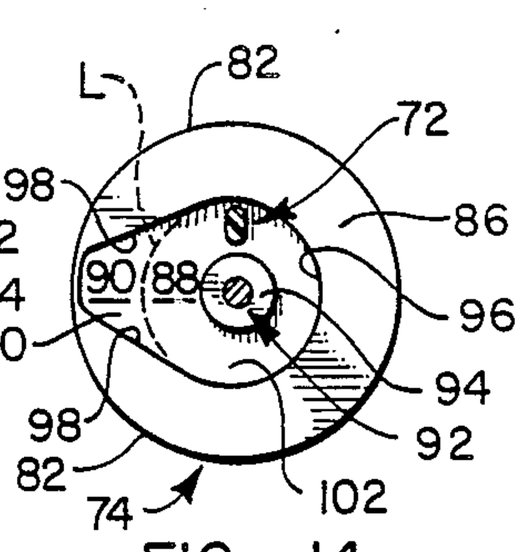


FIG. 14

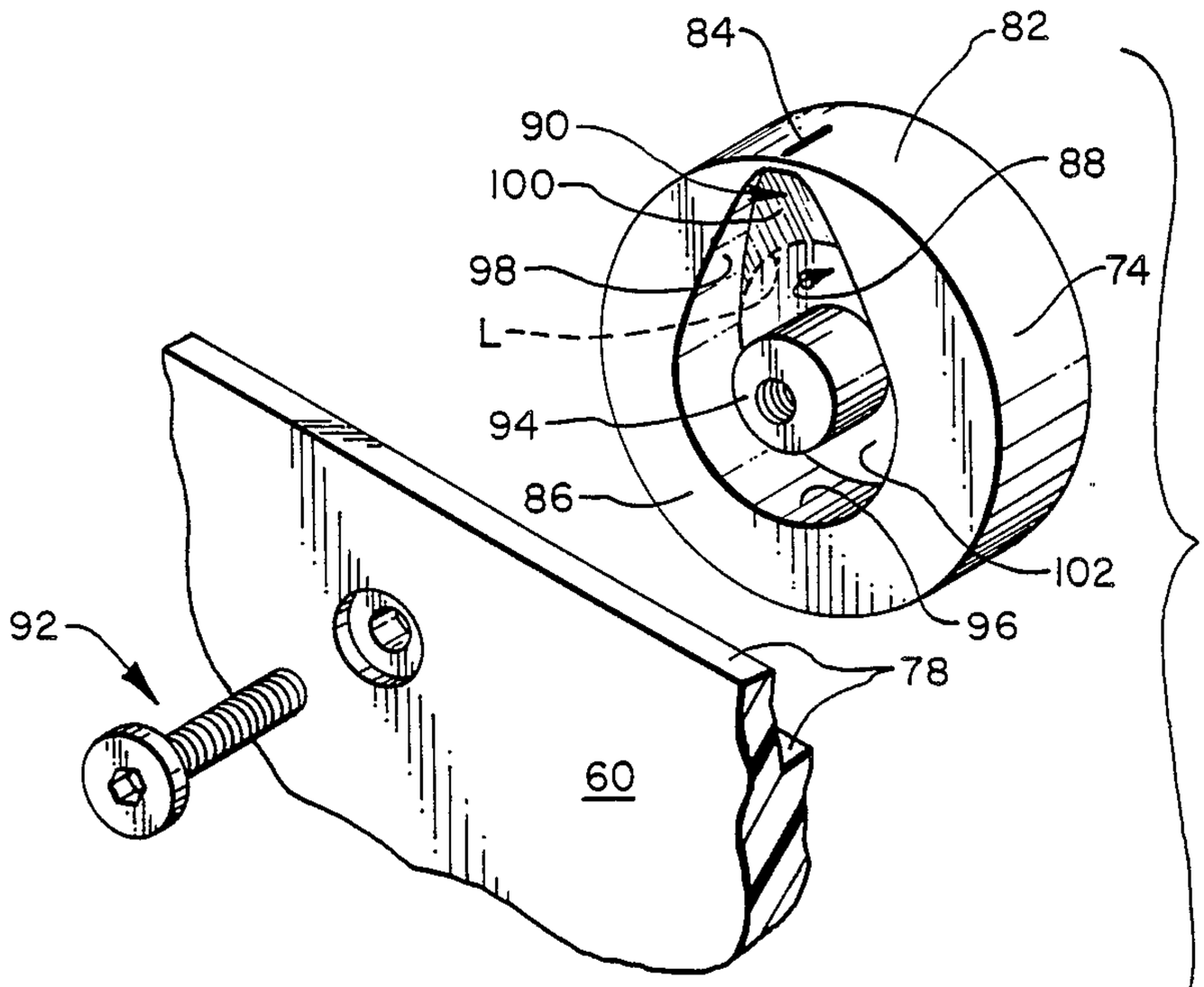


FIG. 15

CLOSURE CLASP

RELATED APPLICATIONS

This is a continuation-in-part application of U.S. patent application Ser. No. 07/112,491 filed on Oct. 26, 1987, and now abandoned.

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to closure devices and more particularly to a clasp for releasably securing the opening to a container, such as a purse, a jewelry box, a suitcase, or a file for documents or collectibles. Taken in a somewhat broader aspect, the invention has potential applicability to the closure of larger containers, such as cupboards, mailboxes, cabinets, and even rooms, where the opening requiring closure takes the form of a window or door.

2. Background Art

Many approaches have been used to effect the secure closure of both small and large containers, such as those described above. One approach has involved the use of a fixed member or catch on one side of the opening to be secured and a moveable latch opposite thereto on the other side of the opening. Typically, the latch, which is rotatable in a plane parallel the outer surface of the container, is designed to pierce or seize the catch in order to effect the desired closure. In some instances, the latch includes complicated camming mechanisms which act upon the catch once captured and draw tightly closed the opposite edges of the opening involved.

In such known closure mechanisms, the rotation required of the latch to effect capture of the catch is in a single predetermined angular direction of rotation. This then necessitates a degree of experience with the clasping mechanism in order for a user to routinely operate the mechanism in an automatic manner.

When closure is effected in such closure mechanisms, the catch and the elements of the latch that seize it remain in an exposed condition. This can have a displeasing aesthetic consequence. Functionally, however, such exposed components tend to snag on other articles causing damage and risking the inadvertent unclasping of the closure mechanism. Where catch and latch are installed in opposed recesses in the mating edges of the opening to a container, the catch and latch may be concealed, but the complexity of the mechanism and its installation are substantially increased.

Typically, rotatable closure mechanisms of the type referred to employ protruding tabs, thumbpieces, spurs, and levers on the rotatable member. While these elements may enhance the ease by which an operator closes and opens the mechanism, they are features which increase the possibility of an unwanted release of the mechanism due to a chance impact or to snagging. To reduce the chances of this type of release, it is frequently necessary that the rotatable latch be made stiff to rotate, particularly in its closed position. Unhappily, such a solution to the problem of inadvertent releases only results in a mechanism which requires a significant threshold of force for its successful operation.

It is toward this end that a camming action is often incorporated into the rotatable latch. This is undertaken, however, at some cost to the simplicity of the

structure of the latch and its ease of mounting to the container to be closed thereby.

SUMMARY OF THE INVENTION

One object of the present invention is to produce an improved clasp by which to effect closure of a container through the capture of a stationary catch by a latch structure rotatable in a plane parallel to the exterior of the container involved.

Another object of the present invention is to produce a clasp as described above in which the rotation of the latch which can give rise to capture of the catch is not limited in its angular direction.

Still another object of the present invention is a clasp as described above which conceals the stationary and moveable elements of the mechanism when closure is effected.

One more object of the present invention is a clasp as described above in which the latch portion thereof is free of projecting structures, such as tabs, thumbpieces, and levers, whereby the catch involved displays a streamlined aesthetic appearance and affords enhanced security from inadvertent releases due to snags or impacts upon such protrusions.

Yet another object of the present invention is to produce a clasp of extreme simplicity in design and installation, involving a minimum of parts.

Additional objects and advantages of the invention will be set forth in the description which follows, and in part will be obvious from the description, or may be learned by the practice of the invention. The objects and advantages of the invention may be realized and obtained by means of the instruments and combinations particularly pointed out in the appended claims.

To achieve the foregoing objects and in accordance with the invention as embodied and broadly described herein, a clasp for releasably securing first and second closing edges of the walls of a container is provided in one embodiment of the present invention with a catch fixed on the outside of the container adjacent the first closing edge and a knob rotatably mounted on the outside of the container adjacent the second closing edge at a position opposite the catch. The side of the knob adjacent to the container is substantially planar and has formed therein a centrally located recess and a radially disposed catch channel. The catch channel extends from the recess through the periphery of the knob. The knob itself is rotatable into an open position in which the catch channel is oriented towards the first closing edge of the container. In this open position, the catch is received by the catch channel and conducted thereby into the recess as the first closing edge moves into contact with the second closing edge. The recess on the side of the knob adjacent to the container has sidewalls so configured that when the catch is in the recess, the rotation of the knob out of its open position captures the catch within the recess, precluding separation of the first and second closing edges. Rotation of the knob for this purpose can occur in either angular direction from the open position.

In another preferred embodiment of the present invention adapted to be used to secure in a closed position the pivoted first and second portions of a container, a catch and a rotatably mounted knob are fixed on the outside of the first and second portions, respectively, of the container at edges thereof remote from the hinge. A portion of the knob projects beyond the edge of the container at which it is mounted, and the side of the

knob adjacent to the container has formed therein a centrally located recess for capturing the catch and a radially disposed catch channel which extends outwardly from the recess to a point interior of the periphery of the knob.

The knob may be rotated into an open position in which the catch channel is oriented toward the catch and extends beyond the container edge at which the knob is mounted. When the first and second portions of the container are pivoted for the purpose of closing the container, the catch enters the catch channel and passes into the recess. Subsequently, rotation of the knob into a position out of the open position captures the catch within the recess and catch channel to preclude opening of the container.

Preferably, a clasp for securing the opening of a container is provided comprising a rotatable disk mounted on one side of the opening; a centrally located circular cavity formed in the underside of the disk; a slot formed through the periphery of the disk into the cavity; and a catch fixed to the side of the opening opposite the disk. The disk has an open position in which the slot is directed towards the catch, and the catch is received into the cavity through the slot as the container is closed. Rotation of the disk out of its open position then captures the catch within the cavity. Rotation of the disk to capture or to release the catch can occur in either direction.

BRIEF DESCRIPTION OF THE DRAWINGS

In order that the manner in which the above-recited and other advantages and objects of the invention are obtained, a more particular description of the invention briefly described above will be rendered by reference to specific drawings. Understanding that these drawings depict only typical embodiments of the invention and are therefore not to be considered limiting of its scope, the invention will be described with additional specificity and detail through the use of the accompanying drawings, in which:

FIG. **1** is a perspective view of a first embodiment of a clasp incorporating teachings of the present invention and mounted on the walls of a container;

FIG. **2** is a detail view of the catch and knob of the clasp of FIG. **1** shown in close proximity to each other with the knob in the open position thereof;

FIG. **3** is a perspective detail view of the clasp shown in FIG. **1** with the knob thereof in its open position and the catch thereof received within the knob;

FIG. **4** is a cross-sectional elevation view of the clasp shown in FIG. **3** taken along section line **4—4** therein;

FIG. **5** is a cross-sectional elevation view of the clasp shown in FIG. **4** taken along section line **5—5** shown therein;

FIG. **6** is a perspective detail view of the clasp shown in FIG. **3** with the knob thereof rotated out of the closed position thereof;

FIG. **7** is a cross-sectional elevation view of the clasp shown in FIG. **6** taken along section line **7—7** shown therein;

FIG. **8** is a cross-sectional elevation view of the clasp shown in FIG. **7** taken along section line **8—8** shown therein;

FIG. **9** is a perspective view of a second embodiment of a clasp incorporating teachings of the present invention and mounted on the exterior of a container;

FIG. **10** is a cross-sectional elevation view of the clasp shown in FIG. **9**;

FIG. **11** is a cross-sectional elevation view of the knob and catch of the clasp shown in FIG. **10** taken along section line **10—10** shown therein;

FIG. **12** is a cross-sectional elevation view similar to that shown in FIG. **10** in which the catch of the clasp is within the knob thereof;

FIG. **13** is a cross-sectional elevation view of the clasp shown in FIG. **12** taken along section line **13—13** shown therein;

FIG. **14** is a cross-sectional elevation view similar to that shown in FIG. **13** in which the knob of the clasp illustrated has been rotated out of the open position thereof;

FIG. **15** is a disassembled perspective view of the underside of the knob of the clasp shown in FIGS. **9–14**.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In FIG. **1** is shown a selectively openable container **10** having a lower receptacle portion **12** and a lid **14** corresponding thereof. Receptacle portion **12** and lid **14** are hinged together at edges **16, 18**, respectively. This configuration of the components of container **10** defines a first closing edge **20** of a wall **22** at the side of lid **14** remote from hinged edge **18** thereof. Similarly, a second closing edge **24** of a wall **26** is located remote from hinged edge **16** of receptacle portion **12**.

As shown in FIG. **1**, container **10** is provided with a clasp **30** incorporating teachings of the present invention for releasably securing first closing edge **22** and second closing edge **24**. Clasp **30** comprises a catch **32** and a knob **34**. Catch **32** is fixed on the outside of wall **22** adjacent first closing edge **20**. Knob **34** is rotatably mounted on the outside of wall **26** adjacent closing edge **24** thereof at a position that is opposite catch **32** when lid **14** and receptacle portion **12** are pivoted about the hinged edges **16, 18** to close container **10**.

While container **10** has a receptacle portion and lid which are hinged, it is well within the capability of a clasp, such as clasp **30**, to effect the releasable securing of closing edges of walls of a container in which the receptacle portion and lid are completely detachable from one another. In such a case, it would only be necessary to provide two or more clasps, such as clasp **30**, suitably located about the periphery of the opening between the receptacle portion and lid.

The opposing position of catch **32** relative to knob **34** is more readily appreciated by reference to FIG. **2**. There it can be seen that as first closing edge **20** carrying catch **32** approaches second closing edge **24**, the two components of clasp **30** are brought into engagement with each other.

Knob **34** has curving peripheral sides **36** that are normal to wall **26**. While being depicted as being a disc of generally cylindrical shape, knob **34** may assume any alternative shape that is capable of permitting the functional requisites of the present invention to be effected. Thus, a knob of the present invention could alternatively be configured as a regular or irregular polygon, or as any other decorative shape. The sides of such an alternative knob need not necessarily be normal to the outside of the container on which that knob is mounted.

As will be more fully disclosed in relation to subsequent figures, a centrally located cavity is formed in the underside of knob **34** that is adjacent to container **10**. A slot **38** is shown in FIG. **2** as being formed through peripheral side **36** of knob **34** into the cavity. Slot **38** functions as the radially remote terminus of a catch

channel that extends from the cavity in knob **34** through the periphery thereof.

Being rotatably mounted to wall **26**, knob **34** in FIG. **2** has been rotated into an open position thereof in which slot **34** and the catch channel associated therewith are oriented towards first closing edge **14** and catch **32** mounted thereon. In the open position of knob **34**, catch **32** is receivable in slot **38** and through the catch channel associated therewith into the recess on the underside of knob **34** when first closing edge **20** is moved into contact with second closing edge **24**. This relationship of the elements of clasp **30** and container **10** is shown in perspective in FIG. **3**.

In the embodiment of the invention illustrated in FIGS. **2** and **3** catch **32** is a relatively broad projection from wall **22** having a curved upper surface **40** and a lower surface **41** terminating at the level of first closing edge **20**. These aspects of catch **32** are not, however, required by the inventive clasp as broadly disclosed herein. Alternatively, catch **32** could be a relatively narrow post-like projection or stud. In this case, the width of slot **34** could be narrowed from that shown in FIGS. **2** and **3** accordingly.

Similarly, the amount by which the knob of the present invention extends beyond second closing edge **24** at which it is mounted depends to a major extent upon the structure of the catch with which that knob is to cooperate. In the embodiment of the present invention shown in FIGS. **2** and **3** a projecting portion **42** of knob **34** extends beyond second closing edge **24** toward first closing edge **20**. Accordingly, when first and second closing edges **20**, **24**, respectively, are in contact, as in FIG. **3**, projecting portion **42** of knob **34** overlies wall **22** of lid **14**. In this fashion, catch **32**, which is secured at the portion of wall **22** overlain by projecting portion **42** of knob **34**, comes to be disposed behind knob and the upper surface **44** thereof. To the extent that catch **32** is made to depend downwardly from wall **22**, so that catch **32** projects beyond first closing edge **20**, then knob **34** can be located lower on wall **26** and still receive catch **32** therein when first and second closing edges **20**, **24**, respectively, are in contact. Such an arrangement is considered to be within the scope of the present invention.

A better understanding of the interaction of catch **32** and knob **34** to secure closure of container **10** can be derived through an examination of FIGS. **4** through **8**.

In FIG. **4** it will be seen that the side **45** of knob **34** adjacent to wall **26** has formed therein a cavity or recess **46** into which catch **32** is received by way of slot **38** when catch **32** and knob **34** are in the relative position depicted in FIG. **3**. While peripheral sides **36** of knob **34** as shown in FIG. **4** are relatively thin, in instances where the radius of knob **34** substantially exceeds the radius required to contain recess **46**, peripheral sides **36** will exhibit additional thickness. Under such circumstances, projecting portion **42** of knob **34** will extend further beyond the second closing edge **24** than is shown in FIG. **4**, and slot **38** will necessarily function as the radially extreme end of a channel leading from the outer surface of peripheral side **36** into recess **46**.

Knob **34** is secured to wall **26** by means of a pin **48** that passes through recess **46** and defines of the center of rotation of knob **34**. If formed of a thermoplastic material, pin **48** may be heated into an enlarged retaining head **50** on the side of wall **26** opposite from knob **34** in order to retain knob **34** in position. Alternative structures for rotatably securing a knob, such as knob **34**, in this manner are known in the art and considered to be within the scope of the present invention.

From FIG. **5**, it will be appreciated that recess **46** is generally concentric with peripheral sides **36** of knob **34**. Recess **46** has walls **52** that are generally circular and concentric with pin **48**. The curvature shown in top surface **40** of catch **32** is thus required to enable walls **52** of recess **46** to pass above catch **32** whenever knob **34** is rotated out of the open position thereof to secure closure of container **10**. Thus, in the position shown in FIG. **5**, catch **32** is actually within recess **46**, and catch **32** may thereafter be captured therewithin by the rotation of knob **34** in the direction shown in FIGS. **3** and **5** by arrow A. This will, for example, bring knob **34** and catch **32** into the relative positions illustrated in FIGS. **6** through **8**.

In FIGS. **6** and **7**, it can be seen that such rotation of knob **34** has moved slot **38** away from top surface **40** of catch **32** to a lower side of knob **34**. In this position, a portion of peripheral side **36** of knob **34** is placed directly above catch **32**, thereby blocking removal of catch **32** from recess **46** in knob **34**. Catch **32** is thus captured within recess **46** and the separation of first and second closing edges **20**, **24** is impossible. The rotation of knob **34** in the opposite direction from that indicated in FIGS. **3** and **5** by arrow A would produce a somewhat similar result. From the open position of knob **34** shown in FIG. **3**, the rotation of knob **34** in either direction therefrom will serve to secure closure of container **10**, if at the beginning of the process catch **32** has passed through slot **38** and is disposed in recess **46**.

FIG. **8** enhances an understanding of the relationship among the structures involved. There, peripheral side **36** of knob **34** can be seen to overlie top surface **40** of catch **32**, precluding its upward movement out of recess **46** and thus also effecting closure of container **10**.

It will thus be observed that clasp **30** in the closed position thereof completely conceals catch **32** and all structures by which catch **32** is captured. With no protrusions on knob **34**, such as levers, thumb pieces, or spurs, there is little possibility of accidentally releasing catch **32** by an accidental impact against knob **34**. Closure is effected by rotation of knob **34** in either direction, and to release catch **32** it is only necessary to rotate knob **34** back into its open position with slot **38** above catch **32**. This may be accomplished by rotating knob **34** in either direction. Finally, clasp **30** includes a minimum of separate parts, including a unitary knob **34** by which closure is effected. While it is conceivable that the elements of clasp **30** might be set in one or more recesses in the container with which it is used, in the form of the invention shown, all parts are easily mounted on the outside of container **10**.

In clasp **30**, the presence of slot **38** in peripheral side **36** of knob **34** detracts somewhat from the resistance of knob **34** to inadvertent opening. While knob **34** lacks substantial projections against which an accidental impact might cause rotation, it is conceivable that a stray impact catching the edge of slot **38** could move knob **34** into the open position thereof. One way to minimize this problem is to reduce the width of catch **32** and correspondingly the length of slot **38**. In a second embodiment of the clasp incorporating teachings of the present invention, the need for a slot in the peripheral sides of the knob of the inventive clasp is eliminated entirely.

Thus, in FIG. **9** is shown a selectively openable container **60** having a first portion **62** and a second portion **64** which are pivoted together at a common edge by a

hinge **66**. Container **60** is provided with a second embodiment of a clasp **70** incorporating teachings of the present invention. Clasp **70** is used to releasably secure first and second portion **62, 64**, respectively, in a closed position. As shown by way of example and not limitation, clasp **60** comprises a catch **72** and a knob **74**.

Catch **72** is fixed on the outside of first portion **62** of container **60** in a position at an edge **76** thereof that is remote from hinge **66**. Knob **74**, which in the embodiment illustrated takes the form of a generally cylindrical disk, is rotatably mounted on the outside of second portion **64** of container **60** at an edge **78** thereof remote from hinge **66**. Knob **74** is so positioned along edge **78** as to face catch **72** when first and second portions **62, 64**, respectively are in the closed position of container **60**. Unlike the operation of clasp **30** shown in FIG. **1**, correct operation of clasp **70** in FIG. **9** is premised upon the rotation of catch **72** on edge **76** about some remote pivot, such as hinge **66**.

Knob **74** could be configured in any number of alternative shapes, but as shown in FIG. **9**, comprises a flat top surface **80** and curving peripheral sidewalls **82** generally normal to container **60**. In contrast to knob **34** of clasp **30**, peripheral sidewalls **82** of knob **74** include no opening, such as slot **38** in knob **34**. Instead, knob **74** is provided at a single predetermined circumferential position on peripheral side walls **82** with an indicator mark **84**. Rotation of knob **74** to orient indicator mark **84** toward catch **72** on edge **76** brings knob **74** into the open position thereof. The interaction of catch **72** and knob **74** to effect closure of container **60** will be better understood by reference to the balance of the figures.

In FIGS. **10** and **11** taken together, it will be seen that the underside **86** of knob **74**, which is adjacent to second portion **64** of container **60**, has formed therein a centrally located recess **88** and a radially disposed catch channel **90**.

Knob **74** is secured to container **70** by way of example with a threaded pin **92** which extends through second portion **64** of container **60** and through recess **88**. Toward this end, a depending boss **94** is formed within recess **88** and provided with cooperating threading. In this manner knob **74** is rendered rotatable about the longitudinal axis of pin **92**. Threaded pin **92** is, however, only typical of the many structures by which a knob, such as knob **74**, could be rotatably attached to the container with which it is used.

As best appreciated in FIG. **11**, recess **88** is generally circular, having walls **96** that are concentric with peripheral sidewalls **82** and with the rotation of knob **74**. For the sake of defining with clarity the boundaries of recess **88**, a dashed line L has been included in FIG. **11** designating the hypothetical location of the portion of walls **96** eliminated at the juncture between recess **88** and catch channel **90**.

Catch channel **90** extends radially from recess **88** to a point interior of the periphery of knob **74**. Indicator mark **84** is located on peripheral sidewall **82** at a point corresponding to the closest approch of catch channel **90** to peripheral sidewalls **82**. As shown in FIG. **11**, walls **98** of catch channel **90** are tangential to walls **96** of recess **88**. Alternatively, however, catch channel **90** could take any number of configurations, including that of a conventional, radially oriented, parallel-sided passageway formed in underside **86** of knob **74** to extend from recess **88** to a point just short of indicator mark **84** on peripheral sidewall **82**.

Catch channel **90** has a roof **100** which is shown as being inclined relative to top surface **80** of knob **74**, so that the depth of catch channel **90** diminishes continuosly with the distance from the rotational center of knob **74** defined by threaded pin **92**. Such a configuration for roof **100** is, however, not absolutely essential, as the roof of catch channel **90** could with roof **102** of recess **88** be parallel to top surface **80** of knob **74**. Consistent with the teachings of the present invention relative to clasp **70**, it would only be necessary that such a roof for catch channel **90** terminate short of peripheral sidewall **82**, in which case channel **90** could end abruptly rather than taper to an end.

Being rotatably mounted to second portion **64** of container **60**, knob **74** is shown in FIG. **10** as having been rotated into the open position thereof in which catch channel **90** and indicator mark **84** are oriented toward catch **72**. An overhanging portion **104** of knob **74** extends beyond edge **78**. In the open position of knob **74**, overhanging portion **104** includes portions of catch channel **90**. Thus, in FIG. **10** catch channel **90** extends with projecting portion **104** of knob **74** beyond edge **78** of second portion **64** of container **60**.

In the open position of knob **74**, catch **72** enters catch channel **90** when first and second portions **62, 64**, respectively, of container **60** are pivoted about hinge **66** into the closed position of container **60**. How this occurs without benefit of catch channel **90** extending through peripheral sidewall **82** is best understood by reference to FIG. **12** in which edge **76** is in contact with edge **78** and container **60** is in its closed condition.

There the path of travel of catch **72** as first portion **62** of container **60** is pivoted about hinge **60** has been indicated in phantom by line M as being an arc of radius R centered at hinge **60** (not shown in FIG. **12**). In opening container **70**, the rotation of first portion **62** thereof upwardly out of the position shown in FIG. **12** moves catch **72** along line M. In the process, catch **72** is retracted laterally to the left in that figure, away from knob **74**. Eventually, catch **72** will have been drawn sufficiently away from knob **74** in a direction normal to underside **86** thereof to clear the edge of peripheral sidewall **82** closest to container **60**. In FIG. **12**, this relationship of parts is reached at point P on line M. Continuing upwardly along line M, catch **72** emerges from beneath knob **74**.

The process of receiving catch **72** in catch channel **90** involves a mere reversal of this process. The relationship of parts shown in FIG. **12** may more clearly be understood by reference to FIG. **13**, where catch **72** can be seen to rest within dotted line L designating the boundary of recess **88**. Rotation of knob **74** in either direction from the open position thereof illustrated will capture catch **72** within the combination of recess **88** and catch channel **90**. By way of illustration, rotation of knob **74** in the direction shown by arrow B in FIG. **13** will bring the components of clasp **70** in FIG. **13** into the relationship depicted in FIG. **14**.

In FIG. **14** catch channel **90** has been rotated to the side of knob **74**. Peripheral sidewall **82** of knob **74** is thus directly above catch **72** where it precludes the upward movement catch **72** out of recess **88**. In this manner the closure of container **60** is secured. Rotation of knob **74** into the open position thereof with catch channel **90** directly above catch **72** will permit the release of catch **72** and the opening of container **60**. For additional clarity of disclosure, FIG. **15** depicts in perspective under-

side **86** of knob **74** and recess **88** and catch channel **90** formed therein.

Clasp **70** exhibits all of the advantages described above in relation to clasp **30**. In addition thereto, however, clasp **70** exhibits a more streamlined appearance and is less susceptible to inadvertent opening due to accidental impact. This is due to the absence of any break in peripheral sidewalls **82** of knob **74**.

On the other hand, unlike clasp **30**, clasp **70** requires that the portion of the container bearing the catch for clasp **70** must be hinged or otherwise pivoted into position behind the knob thereof in the manner described in detail in relation to FIG. **12**. In clasp **30** the presence of an opening, such as slot **38**, in the peripheral sidewalls of knob **34** enable the catch associated with clasp **30** to enter the space behind knob **34** travelling in a linear, translated line of travel. In relation to clasp **70**, however, this is not a possibility.

Accordingly, if it is desired to utilize clasps, such as clasp **70**, to secure the closure of a container having a lid and receptacle portion which are not attached, it will be necessary to utilize a pair of clasps, such as clasp **70**, on each of two opposite sides of the container. Generally, the knobs associated with such clasps are both mounted on the same portion of the container. Both knobs must are placed in the open positions thereof. A first of the catches is inserted behind its corresponding knob while holding the two portions of the container at an angle to each other. Then the opposite edges of the container are pivoted about the first knob and catch to enable the second catch to pass behind its knob. Both knobs can then be rotated out of their closed position to secure closure.

While the embodiments of clasps disclosed herein have been utilized in relation to rigid box-like containers, the concepts and structure disclosed have far wider applicability. Clasps such as clasp **30** or **70** can be used to effect the closure of larger containers, such as files, trunks, cupboards, and closets. Under appropriate circumstances doors and windows may be securable by devices incorporating the present teachings. In addition, the clasps disclosed herein will function to secure the closure of nonrigid wrappings and containers, provided that the items housed therein or wrapped thereby are adequately bulky to ensure that the closure or wrapping thereof results in a persistent tension in the container or wrapping. Such tension is generally necessary to keep the catch of the present invention in the knob thereof.

The invention may be embodied in other specific forms without departing from its spirit or essential characteristics. The described embodiments are to be considered in all respects only as illustrative and not restrictive. The scope of the invention is, therefore, indicated by the appended claims rather than by the foregoing description. All changes which come within the meaning and range of equivalency of the claims are to be embraced within their scope.

What is claimed and desired to be secured by United States Letters Patent is:

1. A clasp for releasably effecting secure closure of a container having first and second portions pivotally attached to each other at a common edge, the first and second portions being pivotable into mating engagement in a closed position, said clasp comprising:

(a) a catch fixed on the outside of the first portion of the container adjacent an edge thereof remote from the common edge;

(b) a knob rotatably mounted on the outside of the second portion of the container adjacent an edge thereof remote from the common edge at a position opposite said catch when said first and second portions are in the closed position thereof, a projecting portion of said knob interior to the peripheral circumference thereof projecting beyond the edge of the second portion of the container to overlap the first portion of the container when the first and second portions are in the closed position thereof, and the side of said knob adjacent the container defining an underside of said knob;

(c) a recess centrally formed in said underside of said knob; and

(d) a catch channel formed in said underside of said knob communicating with said recess and extending therefrom radially outwardly into said projecting portion of said knob to terminate at a radially extreme point within said projecting portion;

said knob being rotatable into an open position in which said catch channel is oriented normal to and extends beyond the edge of the second portion of the container, said catch channel in said open position of said knob being enterable by said catch when the first and second portions of the container are pivoted into the closed position thereof;

said recess and said catch channel having sidewalls so configured that rotation of said knob into a position out of said open position when said first and second portions are in the closed position captures said catch in said recess and of said catch channel to preventing pivoting of the first and second portions out of the closed position thereof.

2. A clasp as recited in claim **1**, wherein said walls of said recess are concentric with the rotation of said knob.

3. A clasp as recited in claim **1**, wherein said walls of said recess are normal to the outside of the container.

4. A clasp as recited in claim **1**, wherein the walls of said catch channel are tangential to the walls of said recess.

5. A clasp as recited in claim **1**, wherein said recess is generally circular.

6. A clasp as recited in claim **1**, wherein said knob is generally cylindrical.

7. A clasp as recited in claim **6**, wherein said recess is concentric with the periphery of said knob.

8. A clasp as recited in claim **1**, wherein said knob is secured to the container by a pin that passes through said recess.

9. A clasp as recited in claim **1**, wherein said knob is rotatable in either angular direction from said open position thereof.

10. A clasp as recited in claim **1**, wherein the distance from any point on the roof of said catch channel to the plane of said underside of said knob defines the depth of said catch channel associated with said any point, and said depth of said catch channel diminishes continuously with the distance of said any point from the center of rotation of said knob.

* * * * *